Feature

Keeping up appearances

Orchids show an astonishing floral diversity yet an ability to hybridise in the hands of breeders. **Nigel Williams** reports on a new study that shows how neighbours appear to avoid the hybrid trap in the wild.

Orchids are one of the most fascinating and diverse plant groups. With an estimated 18,500 species worldwide they show remarkable floral diversity and reproduction strategies. Plant breeders have found that it is often easy to produce hybrids artificially between species but this does not often occur in the wild. So one of the key questions about these plants is how species that occur together and flower at similar times prevent hybridisation. One strategy developed by members of the *Ophrys* group of orchids has been to attract just one species of pollinator for each orchid species, a phenomenon much investigated and which attracted the interest of Charles Darwin.

Separation: Orchids, including this early spider orchid (*Ophrys sphegodes),* appear to have evolved different methods to prevent hybridisation.

But in the Mediterranean region, many species of orchids co-exist, flower at similar times and are visited by the same pollinating insects. How do such species survive and avoid hybridisation? This was the question asked by Salvatore Cozzolino, at the University of Naples, Saverlo D'Emerico at the University of Bari and Alex Widmer at the Geobotanical Institute in Zurich. Reporting in the Proceedings of the Royal Society (published online), the team have examined 13 species of orchid that grow in the same areas and flower at similar times. Six species pairs were identified as having shared pollination insects and seven species pairs which use different, specific pollinators.

The team studied chromosomal features of the different species to determine whether the karyotype of the different orchids might be a mechanism for a post-pollination means of preventing fertilisation and therefore hybridisation.

The researchers found that there was a higher degree of intrachromosomal asymmetry between the species pairs that shared a pool of common pollinators compared with species pairs that have different pollinators. Moreover, they found that the differences in karyotype were not significantly correlated with genetic divergence, further suggesting that co-existing orchids may have evolved karyotypic differences as a means of reproductive isolation.

The authors believe the absence of post-pollination isolation mechanisms in species that have evolved to have specific pollinators suggests that such specificity is important and may help explain the karyotypic differences in species that share common pollinators and thus prevent easy hybridisation in the natural environment.